Going On-line: Publishing Departmental Standard Operating Procedures on the Internet

A Benefit-Cost Analysis

Fire Service Financial Management

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ABSTRACT

A time-consuming task of distributing updates to Standard Operating Procedures was identified, a task that involved spending six hours for an employee to drive to 11 firehouses to deliver new or updated SOPs. It was proposed that Internet technology could be substituted in the distribution process, thus offering a considerable time savings and more efficient use of personnel and resources.

The purpose of this project was to produce sample on-line versions of SOPs, by working through the following three questions:

1) What is the personnel and resource cost of our conventional method of distributing SOPs with a firefighter driving to 11 firehouses within a 45 square mile city?

2) What are the considerations and administrative contexts for introducing on-line versions to our firefighters, considerations such as hardware, software, and user-accessibility to documents that once were hard-copy, but now are electronic?

3) Is a cost-savings the primary or motivating benefit, or do intangibles such as service and a conformation to the ideal of progress supercede saving money?

The historical context in which the production and distribution of SOPs is described, showing the importance of SOPs in managing a large fire department. The author discusses the processes and cognitive factors involved in accommodating users to Internet layouts and design considerations. Finally, recommendations are given for applying this project to other fire departments, both large and small.

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INTRODUCTION

This project studies the feasibility of using the Internet to improve administrative communication on the Peoria Fire Department. Specifically, the administrative communications that are the target of this proposal are the department standard operating procedures (SOPs). These documents are now kept in three-ring binders and placed in each of Peoria's 11 firehouses. That these documents now exist in hardcopy means that revisions and additions (a frequent occurrence) must involve taking the revised or new SOP to each firehouse. The City of Peoria covers over 45 square miles, which means that travel to each of the 11 firehouses takes much time. The firefighter delivering these hardcopy SOPs often takes about six hours to stop at every firehouse, removing old pages and inserting new ones. Some firehouses, such as our Central house, have multiple copies of the SOPs, so his stay there is longer than at a single firehouse with only one copy.

Until the recent pervasiveness of the Internet, a pervasiveness that reaches most houses, businesses, and schools, such travel distances were deemed an inherent necessity for distributing the SOPs. No other way was possible. However, the introduction and popularity of the Internet brings us an efficient way to communicate these procedures to firehouses. The project now before us discusses the planning and implementation of converting our hard-copy SOPs to electronic, on-line versions to be available to all of our firehouses soon to be connected to the Internet. Sample pages have been published, a check to determine if indeed the project was feasible.

The possibility of implementing such an electronic text now casts our existing method of manual distribution in a different light. The existence of the Internet now

shows that the Peoria Fire Department has a problem to be solved in its current means of distributing SOPs. The problems we may see are ones of inefficiency and waste.

It is interesting to note that our current means of distributing SOPs is not inherently problematic; that is, there is nothing wrong with it. Taken as a thing-in-itself, it has always satisfied its users. SOPs have always been delivered promptly and thoroughly. No firehouses have been skipped during the many distributions and no emergency response or administrative policy has suffered from the timeliness of our current means. It is only when we place the Internet capabilities next to our current means and draw a comparison that we see that a problem can exist, the problem of failing to progress, using existing technologies to improve efficiency. The current, manual distribution of SOPs now seems archaic, with one firefighter driving throughout the City in six hours distributing documents that can be posted electronically in one second. Moreover, that same employee is using one of our department vehicles, a Chevrolet Suburban, to drive to these firehouses. This vehicle has a gas-mileage rating of about 14 miles to the gallon. Compared to using the Internet for posting documents, using a sport-utility-vehicle to deliver the same information wastes much gas.

We now expand our comparison to this: With the Internet, an employee would sit in front of a computer and click a mouse to post SOPs. With our current means, an employee uses about two tons of iron and steel, and must be belted in to his seat while he takes the usual risks of driving throughout the City to complete the distribution. Our problem then, rests not with the way things are, but with what they could be. Our problem exists because we have willed it, a human construction brought to bear out of a Western Civilization need to "Step Lively" and seek improvement.

To solve this problem, the research method of action shall be used, an action in the form of a proposal that urges the Peoria fire administration to convert our hardcopy SOPs to electronic texts. The action method shall rely on some traits of other research methods, meaning, that to convince the administration to act, this author must win their trust through a careful analysis of the existing problem and a confident and knowledgeable presentation of the results and consequences of Internet based SOPs.

While working through this process, the following research questions will be answered:

1) What is the personnel and resource cost of our conventional method of distributing SOPs with a firefighter driving to 11 firehouses within a 45 square mile city?

2) What are the considerations and administrative contexts for introducing on-line versions to our firefighters, considerations such as hardware, software, and user-accessibility to documents that once were hard-copy, but now are electronic?

3) Is a cost-savings the primary or motivating benefit, or do intangibles such as service and a conformation to the ideal of progress supercede saving money?

BACKGROUND AND SIGNIFICANCE

The Peoria Fire Department has used SOPs for about ten years, first beginning with documents that used the SOPs of the Ft. Worth, Texas Fire Department as a model. This first effort at SOPs began with a few topics such as Incident Command and radio procedures, but was a set of documents in which the name "Peoria" was merely substituted for "Ft. Worth." These first SOPs tried to fit Ft. Worth's procedures nearly verbatim into the different context of Peoria. This first effort, unfortunately, only satisfied the need to have SOPs, whatever that may be, and to provide an affirmative answer to anyone who would ask, "Does the Peoria Fire Department have SOPs?"

These plagiarized documents then were placed in a context that unknowingly gave a comic effect. At their initial release, the SOPs numbered about 10 pages, yet were placed in sturdy three-ring binders, each with a 4-inch spline capable of holding about 1,000 pages. To be sure, the binders allowed room for growth, but the visual effect was similar to that of placing a toddler in overalls made for Paul Bunyan.

During the first year of the SOPs, the fire administration added two or three more SOPs, still not enough to fill the binder, but then decided to stop the current adaptation of the Ft. Worth format and write its own SOPs. To do this, the fire administration decided to put one firefighter in charge of writing the SOPs, and that the SOPs would use mostly active voice and second-person mood to improve readability. Moreover, the SOPs would be divided into two volumes: an administrative binder and a fireground binder. This division, using much smaller three-ring binders, each with 1-inch splines, would make the documents more approachable and user-friendly, inviting the user into the document. This would be the opposite the effect given by the old four-inch binders, which, if filled,

would be about the size of a phone book for a large city, making it intimidating and cumbersome for users.

Since the switch, the two-binder format has about 50 SOPs in each administrative and fireground binder. Each SOP is in the same format to give the documents consistency, a simple format that places a fire department logo in the upper left-hand corner and the title "Standard Operating Procedures" in the upper center, followed by a narrow boxed section that states the topic of the SOP, for example, "TOPIC: Hair and Moustache Guidelines."

Instead of copying the SOPs of another department, SOPs now originate within the Peoria Fire Department. For example, a battalion chief wanted to document the responsibilities of engines, trucks, and rescue squads at fires. He wrote drafts of the SOPs he wanted, then gave them to the firefighter in charge of the SOPs to organize them into the standard format and to add drawings or pictures. After this stage, a copy of each draft was sent to the fire administration and a copy to the local union for checking. In most cases, few, if any, changes are made at this stage, but it allows both groups to participate in the writing process of documents that affect the department. For the fire administration, the chief of operations checks the drafts, and the union vice president checks them for the union. Once both groups approve the drafts, the SOPs are printed in a final draft, numbered, and then distributed to the firehouses. Each new SOP means that the table of contents page must also be changed to show the addition.

The SOPs have worked very well for our department since we began writing them ourselves. They are relied on for training sessions and for references whenever we critique incidents. Yet the SOPs are not the final or only authority on policy on our

department. Other documents such as the labor contract and IFSTA topic manuals provide guidance and direction. The SOPs cover areas not mentioned in the other documents or perhaps not clarified in them. For example, the labor contract states that firefighters may receive tuition reimbursement for fire-related classes, but the SOP on that topic will describe to the firefighters how they may apply for the reimbursements. The contract and IFSTA manuals are bound, which limits their flexibility to changes. The loose-leaf, binder format of the SOPs allows for out-dated information to be easily removed and replaced with new information. The SOPs can then adjust to changes in the reimbursement policies as those policies are affected by other interests such as City Hall and the local community college that administers the classes. Moreover, because the labor contract lasts for five years, the SOPs provide ways to keep agreed upon policies in the contract current to changes.

The existence of the SOPs among other documents and among groups such as the fire administration and the union argues for both groups to check drafts before they are sent to firehouses. The double-checking means that the SOPs will not likely contradict the prevailing wishes of either group and also provides another area in which labor and management can work together on matters in between contract negotiations. The continual SOP production, as well as other meetings, means that labor and management have an on-going incentive to meet, not just at contract renewal time.

We depend on the SOPs for promotional tests, providing content along with the reference books for study material. Our department gives two promotional tests, one for the rank of captain and another for the rank of battalion chief, and the SOPs, both administrative and fireground editions, provide many topics for testing. The SOPs in the

binders at all the firehouses means that all personnel should have access to the SOPs, yet
we have seen that specific SOPs listed as study material for a promotional exam often are
missing from binders around test time. Firefighters, eager to study for the exam often
borrow individual SOPs from the binders and sometimes forget to return them. This
leaves firehouses with missing SOPs and causes extra work to replace them. An added
problem with missing SOPs is first detecting their absence. Whenever, new SOPs are
added or old ones revised, our SOP firefighter must also carry along master editions from
which to check firehouse editions for missing pages. If pages are missing, he must return
to the firehouse to replace the missing page.

 Our department depends heavily on our SOPs and thus we must insure that we
protect and care for them. We think of them of sheets of paper in a binder and perhaps we
are amused by the occasional picture or drawing. Yet we mistakenly may think that a
SOP necessarily must be a hard-copy document, something we can pull from a shelf and
flip through and feel the pages. Instead, SOPs are agreed upon guidelines, verbal
constructions by human beings which for the past few years have existed in the
conventional and timely medium of paper. Were our department around in Ancient
Greece, the SOPs would be transmitted orally, existing exclusively in the minds of men
who relied more upon memory than we do now. Were our department around in the
Middle Ages, only one copy would have existed in a central location, maintained by a
scrivener, and read to the illiterate firefighters. Our current medium places the SOPs in
the hands of every firefighter, thanks to the existence of photocopiers, laser-jet printers,
computer hardware, and the software program PageMaker, a desktop publishing program.
It will be interesting to see how a switch in mediums, from hard-copy to electronic will

change the character of the SOPs. We have heard it often quoted from Marshall McLuhan that the medium is the message. I am proposing that the Peoria Fire Department implement a rather historical event: a switch in mediums, which may be on par with an adoption of an alphabet as it was in ancient times, or with the more recent adoption of the printing press. To be sure, my proposal receives its momentum from other incentives: the incentive to save money and the incentive to be "progressive;" yet other ancillary factors may also prove significant.

In this proposed switch, we link the aura of technology to the profit and loss abstraction of a benefit-cost analysis. In the Fire Service Financial Management class of the Executive Fire Officer Program at the National Fire Academy, the principles of a benefit-cost analysis were shown to range from simple to complex analyses. In 1998, this proposal has become a simple benefit-cost analysis thanks to the availability of computer technology. Were it not for this technology, I probably would not have sought a way to reduce the expense of our distribution of SOPs. Computer technology has opened many applications to which we can apply the principles of benefit-cost analysis. The Procedures and Results sections later on will describe significant benefits that will result from very little cost. As applied to the Peoria Fire Department, the benefit will greatly exceed the cost.

LITERATURE REVIEW

Admittedly the impetus for this proposal and subsequent implementation comes from what rhetorician Richard M. Weaver calls an argument from circumstance, an argument whereby an assessment of a circumstance dictates that one either change quickly or get crushed (1970, p. 215). It's a reaction to an imposed circumstance, in our case the prevalence and availability of the Internet. It's a circumstance that we did not bring about ourselves; instead, we are reacting to the actions of others and attempting to adapt those actions to our circumstance. The phenomena of being crushed I apply to our case as the failing to use the available technology and medium of the Internet. It's a feeling of being crushed or left behind in the dust as other agencies and businesses adopt the Internet while we have not. Failing to use a widespread technology marks us as old-fashioned (in a pejorative way) and resistant to change, a feeling that we are affronting the American drive of progress.

This author's proposal to put SOPs on the Internet resembles other arguments from circumstance we have already encountered in our SOPs. For example, early SOPs existed as text only; newer ones now have color pictures thanks to the availability and affordability of scanners and color printers. These changes made a noticeable and welcome impact on the SOPs, but not, I predict, on as high of scale as a switch in mediums from print to the Internet.

This author's proposed switch based on an argument from circumstance has been discussed in academia. Kumpf and Emanuel (1996) decided to buck the conventional format prescribed by the Modern Language Association (MLA) in formatting research papers and adopt commercial formats to make student reports look like their professional

counterparts. The students of Kumpf and Emanuel are graduating seniors preparing proposals for commercial engineering clients. Instead of submitting conventional documents in the MLA format of double spaced, one column, one-sided pages (similar to this document in APA format), they encouraged their students to use the technology available from computer software and hardware to imitate the format of professional documents. Kumpf and Emanuel believed that student documents were in an argument from circumstance, that students were going to use increasingly more of the computer's capabilities to write reports, from simple word processing to formatting multiple columns to importing high-resolution photographs. These students with high-tech plans for documents were restricted by a decades-old MLA format requirement, so Kumpf and Emanuel instructed students to choose formats from journals or industry publications and imitate them in their own documents. The results, Kumpf and Emanuel reported, were striking, showing that the computer and its added capabilities of desktop publishing gave students more responsibility and control over their documents, a responsibility that increased student interest and curiosity in the writing and designing process of communicating with their clients.

Having discussed the motivation for the Internet proposal, I now will review some contexts in which on-line documentation has supplemented or replaced conventional hard-copy documents. Since the pervasiveness of the Internet has influenced nearly all discourse communities, I shall narrow my discussion of the Internet as applied in instructional contexts. An instructional context such as in corporate training or education resembles the context in which this proposal will appear. Journals such as *Technology in Higher Education*, *Computers and the Humanities*, and *Computers and Composition*

frequently contain case studies or descriptions of applying web sites to conventionally print-dominated contexts.

From *Computers and Humanities*, Katz (1996) focuses on the role of web sites as supplements to teaching literature. Web sites can offer secondary source material to primary hard-copy documents such as novels or poems. Or, in some cases the primary text is the web site, a web site whose contents such as hyper-novels or hyper-poems only exist electronically and are not available in hard copy unless users decide to print the screen. I found Katz's research useful in learning the user reaction to web sites as secondary and primary source for instruction. In our context of fire department SOPs, the web site shall be the primary text for operating procedures, a primary text whose existence may be influenced by its users, more so than in hard-copy versions. For example, a SOP as web site is by definition easily changed. Once a SOP is posted, users may be more apt to submit suggestions for edits or additions to the fire administration since corrections can be easily made. This flexibility may encourage more participation by the users in the formation, discussion, and implementation of policy. Katz found that web sites had this very effect on students and teachers, both groups found that web sites offered users more input and therefore more interest into the assigned texts.

In *Computers and Composition*, Moulthrop and Kaplan (1991) reported similar positive observations from users of web sites. Compared to hardcopy texts, users, the pair state, deviate from a linear mode of reading to a mode they describe as arbitrary. The feature of arbitrariness increases as the number of links in a site increases, thus giving users greater choice in determining how they interpret a text. In hard copy, the text is sequential. Users start at the beginning, whether that beginning be in a book, paragraph,

or sentence, and are expected to proceed linearly to some concluding point. The arbitrariness of a web site changes that. A site with many links thus encourages users to construct their own hierarchy of the text, choosing for themselves how they will proceed and what links or items will be chosen to explore and which will be ignored.

In *Technology and Higher Education*, Coleman (1993) notes the added quantity of experiential content a web site offers users in interpreting a text. He compares a text-only document that relies on words and the images they create to the text + photos + video + sound that a web site can offer. In experiential content alone, a web site can provide far more interpretive cues than can a hard copy document. Applied to SOPs, the challenge then becomes in determining which SOPs lend themselves to the added audio-visual enhancement offered by web sites. In implementing this proposal, I should take care to avoid the assumption that just because a web site offers many visual and audio stimuli, that each SOP should then necessarily contain these embellishments. Many SOPs may not lend themselves to such decoration and to do so may diminish their overall rhetorical effect. For example, in Coleman's view a minimalist text would consist of the propositional content or bare fact of the message unblemished by any modification. Such propositional content, to be sure, exists only in theory. In reality, researchers argue that all human communication arrives with some kind of spin added either by the sender or the medium. The experiential cues that Coleman describes take the form of font choice, layout, photographs, paper quality and heft in hard copy documents, and these same devices plus links, audio, and random selection in web sites. With all of these devices available to the web designer and SOP writer, he must ask if all of his SOPs lend themselves to these features. He must ask if the goal is to provide experiential cues or

create understanding. Nowhere in the many articles on web sites do authors claim that experiential cues alone create understanding. All of them, whether they occur electronically or in hard copy, must be set in the context of the content of the message and the needs of the audience.

The few articles reviewed so far are typical of the thousands now available that advocate the use of web sites to supplement or replace conventionally hard-copy documents. They welcome web site use and are quick to describe and praise its benefits. However, this author has yet to see any articles that steer seekers away from web site technology, articles that develop and discuss drawbacks to a reliance upon web sites. One such problem occurs in the use of hardware. Many web sites assume that the user has hardware only a few years old, hardware possessing the required computer speed and memory to load sites that are becoming increasingly complex. Those users not having the money to buy such hardware, or not having the connections to access a computer that does, are technologically shut out of the communication.

Another drawback to relying on web sites occurs when the electronic document is not available. A power outage or hardware problem can interrupt availability on the receiver's side. Moreover, server crashes can destroy files and sites, sites that have taken much time to create ("Backups? I don need no steenkin' backups!).

A challenge in switching from a conventionally hard-copy text to an electronic medium is acknowledging and planning for the increased visual demands inherent in a web site. To acknowledge that a shift in mediums is occurring strongly suggests that one cannot consider that a SOP in hard-copy can be placed *in toto* onto a web site without any

layout, format, or design changes. Information on a web site necessarily is processed differently than the same appearing in print.

Addressing this phenomenon, communications scholar Marshal McLuhan, (1965) before the introduction of the Internet, called hard-copy pages and their messages "hot," meaning that they are linear, authoritative, and high-resolution (black ink against a white background). All of this is "hot" because it makes a strong sensory impression, like a burning coal. Against this analogy of heat, Weiss (1998) argues that web sites, by contrast, are "cool," random, plebian, fluid, and low-resolution. Often they may be cluttered and encourage digression and backtracking, just the opposite of the linear progression of a printed page. Some sites change daily, reflecting changing information and setting forth the argument that the reality they represent is also dynamic. Anyone who has surfed the web has probably noticed that the more interesting sites are those that draw in the user, offering links to nooks and crannies that embellish, extend, or explain the nodes on whose links they are based. The interest offered by these sites comes from the curiosity, the unknown, and the chance to explore them; that is, by those users who possess the time and curiosity to go further.

Weiss (1998) also set up another contrast between hard-copy documents and web sites. The former, he argues, assumes that the user or reader has a lack of knowledge for which he consults the document to fill the void. For example, a firefighter may lack the knowledge of the steps to connect five-inch hose to a pump inlet. To complete this lack, he will pull the SOP from the shelf and read it to satisfy his curiosity, thus creating completeness to displace his sense of incompleteness on the topic. This view of

communication Weiss call the Hellenistic, whereby the world is an "information vacuum to be filled by the communicator" (105).

Weiss contrasts this conventional way, the way the West has viewed reality throughout the Industrial Age, with an ancient world view that has been revitalized with the use of the Internet. Weiss calls this ancient world view *Talmudic*, a reference to 15th and 16th century folios of the Jewish Talmud, folios he says are remarkably similar in design and interactivity to today's web sites. The Talmudic texts of the Middle Ages, writes Weiss, are not linear, as is the text of today. Instead, a page may contain many blocks of texts arranged in many sections causing the user to move recursively among the bocks to find the needed information. The Talmudic texts contained many guides and signposts to guide the user among the blocks, guides Weiss says, are similar to the links we now find on web sites. Aside from the medieval version of a web site, Weiss states that Talmudic Texts and web sites encourage a different view of communication than the Hellenistic view. Instead of using a document to find needed information to satisfy a void of knowledge, A Talmudic view posits an "information plenum, (105)" where the world is already filled with knowledge to every conceivable question and that knowledge is discovered through study and contemplation of existing texts. All knowledge is preexisting; discovered, to be sure, but its discovery does not occur in a vacuum. Everything is "always already." Weiss's view seems plausible with the sheer availability of and accessibility to seemingly infinite items of raw information via the Internet. So much information is often a few mouse clicks away. His view describes the accessibility to information and the increased responsibility of web designers to provide textual guides for site users to help them navigate topics, yet I think he goes too far in his belief that all

knowledge is merely acquired rather than constructed. For example, a SOP on a web site

may indeed contain links to related information on many other sites. This is the Talmudic

view, of helping the user to acquire pre-existing information. The Hellenistic view,

however, still applies when those sites invite feedback that can modify the message. As

departmental policies change or are added, their additions suggest a new thing, something

not available anywhere else. In this view, the new information fills a void, but is

constructed out of pre-existing knowledge. The constituent parts are always already.

Weiss and many others have described the new way of thinking that accompanies

use of the Internet. However, Rauch, Leone, and Gillihan (1997) urge that site designers

should include stronger reminders of the past to accommodate users of sites when the

purpose of the site is primarily information delivery. They argue that the metaphor of a

book applied to web sites makes information more accessible to users because those users

are applying previously learned ways of interpreting text to a new medium. In other

words, site designers should use visual and textual cues reminiscent of the way a book,

magazine, or journal is organized to help users easily navigate the site. Many on-line

magazines already use this rhetorical strategy in formatting their web site. For example,

the on-line magazine of political opinion, *Slate* (www.slate.com) has no direct hard-copy

antecedent. Yet it borrows heavily from the book or magazine metaphor of hard-copy

magazines by organizing its homepage to resemble the contents page of a conventional

hardcopy magazine. Users most likely to read (and subscribe) to *Slate* are already used to

the format for journals of political opinion. *Slate* thus identifies its purpose, intent, and

audience by resembling the first impression of other hard-copy journals. Instead of a

cover, *Slate* has a quarter-page drawing that identifies the "cover story" of the week. On

the same screen and with little scrolling, the user spots the articles organized into

conventional journal categories such as "features" and "departments." The titles on the

home page, of course, do not use page numbers to refer the user to those links, but use the

colored text of links to invite the curious to "click here."

      Contrast the book metaphor of *Slate* to another popular site whose purpose is also

a source for information, but the purpose is primarily for entertainment. *Cartalk*

(www.cartalk.com) features entertaining and often useful advice on car repair and use.

Since its purpose is primarily entertainment, the designers do not use the book metaphor

but rely more on visuals to set the tone. For example, the home page has one large color

drawing with labels on parts of the drawing for users to click. The first impression

decisively does *not* evoke a book metaphor, and consequently, sets a different tone and

resulting purpose, audience, and intent. The findings of Rauch, Leone, and Gillihan I

have found useful in setting a tone for my proposed web site for SOPs. Plans have been

made to maintain the book metaphor and its attendant cues to the authority, organization,

and resources of the hard-copy SOPs, thus relying on the acquired familiarity with them

to help the user's introduction and acceptance of the electronic versions when they

become available on-line.

PROCEDURES

Now that this author has discussed the theoretical context in which to propose the SOP web site and how the ideas of others that have influenced my thinking, I shall now describe the procedures used to construct the proposal and what has led to the sample pages recently published. The goals of the project included two primary points: 1) introduce Internet capabilities to our fire department, providing a sign that we recognize and adopt current technology in an effort to improve our administration of policies and procedures; and 2) save money and reduce the time it takes to distribute SOPs to our firehouses. This project and research cannot be confined to a simple question of comparing current costs of SOPs in hard copy to electronic versions. Were that so, the hard copy versions are much cheaper because new computers for each firehouse capable of using the Internet must be in place. Yet I am (happily) working under the knowledge that our firehouses will get those computers by the end of 1998, courtesy of the City's Information Services department. The promise of electronic SOPs and other information advantages is one way to complement that acquisition. Moreover, the Information Systems department handling the computer systems for the City expects to wire each firehouse for Internet access also by the end of 1998, a connection whose cost will not come from the budget of the fire department.

The cost of publishing a hard-copy SOP is as follows:

Layout, and design:	2 hours @ $35 per hour
Distribution:	6 hours @ $35 per hour
Total:	**$280** (8 hrs @ $35 per hour).

The SOPs are produced using the software PageMaker on a Compac personal computer with a speed and memory contemporary with equipment available in 1998. For the importation of photographs, we use a Hewlett Packard ScanJet 4p and Visoneer Paperport software. These items were not bought specifically for the publication of SOPs, but are used for other publications in daily office work such as daily training guidelines, letters, and audio-visual aids for training sessions.

Since all of the hardware and software for producing a SOP is already in place and is used independently of SOP production, the significant cost of SOP production is layout and distribution. In an on-line medium, the production time would remain the same, leaving the distribution cost as the factor to be eliminated. It is the distribution cost that is the target of the cost reduction and the cost most affected by the use of the Internet. Our department has the benefit of computer support from our city's information services department, a department that will soon install DS-1 data cables to all of our 11 firehouses. Moreover, the information services department is installing personal computers in all the firehouses, computers capable of Internet access. This support from the city's computer department means that our fire department budget does not have to plan for nor pay for computer equipment, data cables, or most software. To be sure, someone must pay for these items and that someone is the City. Its on-going computer support means that a benefit-cost study of Internet application to SOPs can be narrowed to a matter of personnel management of time. Instead of pricing equipment, the focus is on managing the time of our firefighter producing the on-line SOPs. In our case, the Information Services department will buy and install the computer equipment whether or not we use it to publish SOPs on the Internet. The goal of the City is similar to ours: keep

its operations current with available technology. The managers in the Information Services department know we will use the Internet for seeking information from other fire departments, vendors, and agencies having a web presence. This project will complement that use by adding the feature of providing internal organizational information in the form of SOPs.

Obtaining a Web Site

Again, we are lucky that in due course the City's Information Services Department will have its own server on which the fire department will not have to pay access charges. Until then, an interim location must be found. Toward this short-term need, a local university that has its own server was contacted to see if they could offer us band space for our web site. To our surprise, it was learned that we could use their server at no charge, with the stipulation that once the City installs its own we would move. In planning for this eventual move, our web site designer has been instructed to save all files on floppy disks.

 Our employee who has designed and written our SOPs has been asked if he would continue to work on them on-line. He graciously agreed and offered to set up sample web pages of the on-line versions. The samples he provided are located on the server at the local university that has loaned us band space. His process of creating these sample pages was worth noting, taking advantage of resources available at that local university. To transfer pages from hard-copy to on-line versions, he used the help of student web-technicians at the university's computer-assistance department called *Interlabs*. The students there showed our employee how to write web pages using HTML

and the Internet browser and editor *Netscape Gold*. Such help from the local university may be available to other city fire departments from their local colleges and universities. These schools seem eager to create good relationships with local governmental agencies such as fire departments and their Internet help is one way to achieve this.

The process of transferring data from hard-copy to on-line can be sizeable, especially if a department has many SOPs. To create the first samples, authorization was given to our SOP firefighter to work one hour a week for 14 weeks at the university's *Interlabs,* a time spent learning *Netscape Gold* and also experimenting with layout and design considerations. Upon conclusion of the period, he decided upon a format very similar to the existing format of the hard-copy SOPs, a format that is easily readable and conducive to quick access of information. It also conforms to the design considerations discussed earlier in the Literature Review. While preparing the sample pages, our employee learned that using *Netscape Gold* took no longer than using the *PageMaker* program he uses for the hard copy version. This time equivalence means that we will lose no time in document preparation by going on-line, leaving the significant cost benefit to appear in the distribution process.

The success of this project has hinged much upon timing and location. Its timing means that in 1998 this project has been far easier than if it would have been proposed just four years ago. At that time the availability and accessibility of Internet service was not as prevalent as it is today. The project would have been possible, but not probable, due to the expense involved in installing data cables and buying computers. Were this project proposed four years ago, factors such as prices for hardware, software, and cable installation would be necessary. In current fiscal environment of our City, these factors

are a given, taken for granted as much as we do the existence of our telephones. The other factor, location, stems from the size of our city, a city of over 100,000. A project such as this may be more difficult in small towns where the local fire department cannot rely on a computer infrastructure and support already in place and eager to help. Absent this situation, a small department may have to budget for the hardware and software necessary to implement on-line SOPs.

In summary, the procedure to accomplish this cost benefit is as follows:

1) Find an Internet Server on which to locate your web site;

2) Insure receivers of the SOPs have computer terminals and Internet access, in our case, all of our 11 firehouses;

3) Acquire a web editing program, such as *Netscape Gold* and insure that an employee is trained on its use. In Peoria, we designated our training academy as the site for the computer terminal that will have this web editor.

Initially, this transition process seemed daunting, especially since much of the technology now popularly available is only a few years old. But given the impetus of an economic cost savings, I learned that much of the system is already in place and that it merely takes initiative to apply it to an economic benefit. Herein lies the lesson from this project: assess current administrative procedures and determine if emerging technologies or methods can improve them for those who manage them.

RESULTS

The result of this project has manifested itself in many ways. First, we have the physical product, the electronic SOP existing in cyberspace but manifesting itself on the computer screen (a sample page is included in the Appendix). It was also learned that with the City's computer network we will have the capability to print these on-line SOPs, a feature that will probably not be used often, given the preference of on-line accessibility. However, if employees wish to include hard-copy versions of a SOP for their own use, they would have this capability.

Second, the most important result and the object of this study is the time savings we now have in distributing SOPs, a time savings that eliminates driving to each of our 11 firehouses to distribute new or updated SOPs. This result corresponds with the first research question. The time that once was spent delivering SOPs can be used for other duties. Recall that about six hours was required to distribute hard-copy SOPs at an hourly rate of $35 that totaled just over $200. With the on-line SOPs, this $200 may be more productively spent. To be sure, we will spend the money in wages whether or not the SOPs are on-line. The existence of the on-line versions means that the time and wage will now be put to better use. In hard copy, our SOP firefighter made about 20 trips each year distributing new or updated SOPs, an expense that totaled about $4,000.

A third result of the on-line SOPs is the continued and improved relationship we enjoy with the City's Information Services department. This result corresponds with the research questions two and three. Arranging for eventual space on the network server and for connecting to the Internet required that our SOP employee meet and work with technicians from Information Services. This interaction went well, which means that we

can rely on their help quickly should problems arise. We want to keep in good favor with Information Services since so much of our record keeping and administrative operations depend upon computer technology.

I have determined that the motivating benefit for the switch has been a conformation to the ideal of progress, a conformation that has been greatly helped by computer technology. The implementation of this switch is accommodated by the prevalence of Internet technology, with such a switch seen as an appropriate and even welcome medium to transmit information. With the question of the medium allayed, our primary concern in using the Internet is to insure that our web site documents are considerate of the audience and keep the information clear and easy to access.

DISCUSSION

One factor easing the reception of on-line SOPs on our employees is that the medium is popular. Many people privilege the Internet, giving its use and the information gleaned from it a status more *chic* than hard-copy sources. The phrase, "I got it off the 'Net" is often meant to impress upon others that the user is up-to-date; that he is, as Richard Weaver notes, "Stepping Lively" in the realm of information access. This notion transferred to our on-line SOPs should concur with Katz (1996), who noted the eagerness of Internet users to use on-line sources as primary sources in research. A primary source is indeed how I hope our firefighters will view these on-line documents. The medium of the Internet will add a positive flavor to our SOPs, showing our firefighters another realm in which we can administrate current technology to our operations. We are fortunate to

have many new or near-new pieces of apparatus, equipment, and most recently, a

thermal-imaging device that allows our firefighters to see victims amid conditions of

thick smoke. All of these create a positive environment for our firefighters, showing them

that the fire administration wants to provide the best possible resources to our firefighters

in their performance of their jobs. The existence of on-line SOPs complements this

environment, showing them yet another area in which we are adopting current technology

to an administrative and training application.

   With all of the ways of using so much available technology today, we must be

careful to use it intelligently. We may see the cost benefits of using on-line SOPs, but we

must also assume the responsibility to apply it circumspectly. We cannot rely on the aura

of "Internet" itself to validate our use, as if we propose that because a SOP is electronic it

inherently becomes better than a hard-copy version. Toward this concern, our SOP

writer has been urged to consider the design issues raised in such sources as the articles

reviewed earlier and other sources. His sample web pages address the issue of

interpretative arbitrariness as discussed by Moulthrop and Kaplan (1991), a feature

encouraged by including relevant links to other sites that support and complement the

topic. This feature works like a footnote or bibliography; however, with the sense of

immediacy in that it not just identifies the outside source but takes the use to it. Related to

this sense of infinite surfing is Weiss's idea of a Talmudic universe, where the world is

full of information and the job of the user and interpreter is to arrange it for his use. The

sample pages we have produced can easily accommodate this view, providing links to

other sites that in turn link to still more. Those who have already surfed the Internet know

how fun (and time consuming) this can be. The computer terminal in the firehouse then

offers the curious an avenue to learn more about their topics, an offer that also identifies

our department as one that is progressive and aware of the needs and expectations of

workers these days.

Finally, the goal of this project is validated each time our web designer sends a

change or new SOP to the server. We are pleased to see that a mouse click or keystroke

that takes a second now replaces what once took six hours to accomplish with a vehicle.

The application of Internet technology means that time once spent in the distribution

process now can be spent elsewhere in presumably more productive tasks.

RECOMMENDATIONS

The implementation of on-line SOPs becomes a foundation for improved or

enhanced administrative communications between the fire administration and our

firefighters. The on-line versions offer features that are still expensive in hard-copy

versions. On-line, we now can publish sharp, color photographs and add color

embellishments to text that are prohibitively expensive in hard-copy. The color photos we

now publish over the Internet cannot be matched by our in-house, personal-size printers.

We would have to send the photo and documents to a commercial printer for the same

quality of resolution.

The introduction of on-line SOPs at this point in 1998 means that we are

positioned to take advantage of other Internet technology as it becomes available or more

affordable. For example, the anticipated next step in our on-line versions is to be the

inclusion of video segments, providing a real-time account of tactics and procedures that

we now are depicting in still photographs. The introduction of video segments would require equipment that we now do not have. Our department has a few video cameras that are now used rarely and we do not have the ability to publish video on-line. Such features and possibilities we will keep in mind when an administrative need for it occurs. I suspect that need will be felt when the cost and availability associated with it becomes as inexpensive and available as it now is for us to switch from hard-copy to on-line SOPs. In other words the technology will drive process, causing our fire administration to entertain ways to apply it to our needs.

An application of this project for other fire departments depends much on the context, a context consisting of personnel, size, support from City Hall, and budget. Large cities by now already have the Internet capabilities in place, with some even having technicians available to design and publish web pages. For large cities and their accompanying large budgets, a similar implementation of this project will be easier than it would be for a small town that does not have an Information Services department or a budget to contract the work to an outside agency. However, the important factor here is time. Just as a small department may not afford to duplicate this project in 1998, it may be possible four years from now, as the technology becomes less expensive and more available. Recall in an earlier section it was noted than such a project would have been probable, but not possible four years ago for us, the Peoria Fire Department. Its implementation would have been too expensive.

This project, in addition to the empirical product of an on-line SOP, has affected the way I think about the communications we in the fire service use daily in memos or statements of policy, procedures, or administration. The on-line capabilities now

available are not necessarily a means for creating new knowledge, but, consistent with Weiss's Talmudic view, creates ways of organizing our world that is already filled and complete with knowledge. The knowledge available is "always already," we as human beings have merely appropriated the means to rearrange it to something we call useful. This echoes the milleniums-old observation of the Ecclesiastes, that there really isn't anything new under the sun.

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APPENDIX

Reduced-sized sample of on-line Standard Operating Procedure. Layout of on-line version is similar to layout of hard-copy version.

the fire dept.

CITY OF PEORIA

Standard
Operating
Procedures

TOPIC: Trench Rescue: Basic Guidelines for First-In Companies

Approach a trench-rescue cautiously. The State Fire Marshal's Office states: "as many as 65% of all deaths in trench cave-ins are of would-be rescuers." You may become a victim yourself if you don't know what you're doing at a trench rescue. The danger in a trench rescue lies with the likely probability that a secondary collapse of the trench walls will also trap you as a rescuer. The purpose of this SOP is to describe some of the factors at the scene you should check before and during a rescue to prevent a secondary collapse.

Some basic equipment you'll need is listed below:
- shovels
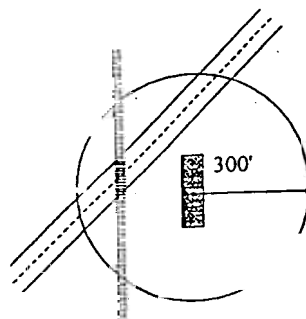- rope
- ground ladders (preferably roofers)

Another essential item is *Airshores,* our pneumatic shoring stored with the Hazmat Team. However, use of the *Airshores* is beyond the scope of this SOP and the Hazmat team is responsible for installing them in a trench. The following section describes some factors to consider for you as a first-responder upon arrival at a trench rescue.

Stop Sources of Vibration

Stop sources of vibration in a 300 foot radius in all directions from the trench as shown at right. Vibrations could cause a secondary collapse. Possible sources of vibration include:
- fire apparatus
- nearby machinery
- traffic from a nearby road
- railroad

Stop sources of vibration 300 feet in all directions from the trench.

You may park your apparatus within the 300 foot zone for easy accessibility to your equipment (but no closer than 100 feet), but you must turn off the apparatus engine. Moreover, you must forbid the use of heavy equipment usually parked nearby. At many trenches, a backhoe or trencher is already there. Order the operator to shut-down his equipment. If the trench is along a road, call the police to stop traffic. If the trench is by a railroad track, call the dispatcher so she can notify the railroad to stop any trains from travelling down the track. The process of stopping nearby vibrations is an early task that the Incident Commander should delegate to arriving companies. Not only does the process prevent a secondary collapse, but it keeps personnel from gathering close to the edge of the trench.